

CHARGE PUMP CIRCUITS AND METHODS

ABSTRACT OF THE DISCLOSURE

[65] Charge pump circuits and methods of the present invention step up an input voltage to provide an output voltage. The charge pump circuits have one or more stages. Each stage may include a capacitor and a transistor. Each stage adds an incremental voltage to an input voltage. The capacitors elevate the voltage at a terminal of the transistors in each stage in response to a clock signal to provide the incremental voltage. The output voltage is the sum of the input voltage and the incremental voltages provided by each stage. One or more of the stages of the charge pump circuit may have a depletion transistor. Depletion transistors may be field-effect transistors that have a lower threshold voltage as a result of an implant in the channel region of the device.

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